

Name

Block

# REVIEWING AND PREPARING FOR THE ALGEBRA 2B FINAL EXAM

- The test is worth 20% of your grade for this trimester!
- You may prepare one 8.5x11 sheet of paper as a "cheat sheet" for the test. It must have your name on it in ink. You may not use some else's card or give yours away.
- The test is not short (67 questions)! In order to have enough time to finish, you will have to be prepared and know how to approach each problem.
- The best way to prepare for the test is to review, fix, and rework your old unit tests, and to complete your reviews.

## FINAL EXAM REVIEW - PRACTICE PROBLEMS

When you complete each chunk of problems, be sure to rate your current understanding by circling the proper number!

1      2      3      4      5

1=perfect!

3= so-so

5= definitely need to re-learn this for the test!

## EXPONENTIAL and LOGARITHMIC FUNCTIONS

1. An exponential function takes the form  $f(x) = a \cdot b^x$ , where  $a$  represents initial amount and  $b$  represents growth/decay factor.

2. If  $b > 1$ , the function is classified as exponential growth and if  $0 < b < 1$ , the function is classified as exponential decay.

Vocab/Basics

1

2

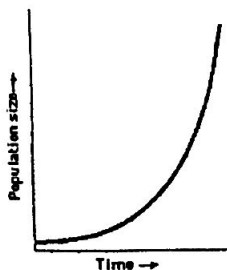
3

4

5

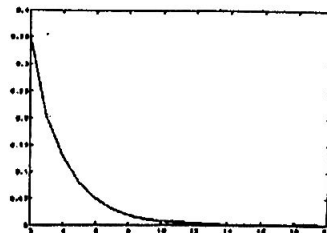
Are the following exponential growth or decay?

3.



growth

4.



decay

-1	27
0	9
1	3

$$6. y = -\frac{1}{3}(4)^x$$

$$7. y = 60(.4)^x$$

decay

growth  
4 > 1

decay 0.4 < 1

Growth or Decay 1 2 3 4 5

Write the equation of the exponential function that models each situation.

8. A scientist starts with 150 bacteria that double in population every three days. Write an equation  $b(d)$  to model the number of bacteria,  $b$ , after  $d$  days.

$$b(d) = 150(2)^{\frac{d}{3}}$$

9. I have \$2500 in a mutual fund that earns 7% every three months.

$$b = 100\% + 7\% = 107\% \Rightarrow 1.07 \quad f(t) = 2500(1.07)^{\frac{t}{3}}$$

10. After the zombie antidote comes out, the 10,000 zombies begin to die out at a rate of 12% each day.

$$b = 100\% - 12\% = 88\% \Rightarrow 0.88$$

$$z(d) = 10,000(0.88)^d$$

11. I have 80 gummy bears and every time I go to the cupboard I eat half of the gummies.

$$g(t) = 80(0.5)^t$$

Modeling 1 2 3 4 5

Find  $x$ .

$$12. 8^{3x-5} = 8^4$$

$$3x-5 = 4$$

$$3x = 9$$

$$x = 3$$

$$13. 2^{6x-2} = 1 = 2^0$$

$$6x-2 = 0$$

$$6x = 2$$

$$x = \frac{2}{6} = \frac{1}{3}$$

$$14. 5^{-2x+1} = 125 = 5^3$$

$$-2x+1 = 3$$

$$-2x = 2$$

$$x = -1$$

Solve Exp Eq. 1 2 3 4 5

15. Rewrite the following logarithms in exponential form:

$$a. \log_3 81 = 4$$

$$3^4 = 81$$

$$b. \log_4 \frac{1}{16} = -2$$

$$4^{-2} = \frac{1}{16}$$

$$c. \log 100 = 2$$

$$10^2 = 100$$

$$d. \ln 15 = x$$

$$e^x = 15$$

16. Rewrite the following exponentials in logarithmic form:

$$a. 5^4 = 625$$

$$\log_5 625 = 4$$

$$b. 3^x = 729$$

$$\log_3 729 = x$$

$$c. e^x = 10$$

$$\ln 10 = x$$

17. Evaluate the following:

$$a. \log_2 32 = x$$

$$2^x = 32 \quad x = 5$$

$$b. \ln e^{12}$$

$$12$$

$$c. e^{\ln x}$$

$$x$$

18. Solve the following:

$$a. \log_7 x = 5$$

$$7^5 = x$$

$$x = 16,807$$

$$b. \log_{30} 10 + \log_{30} x = 5$$

$$\log_{30} 10x = 5$$

$$30^5 = 10x$$

Logarithms 1 2 3 4 5

Overall rating for exponential and log functions

1 2 3 4 5

$$\frac{24,300,000}{10} = \frac{10x}{10}$$

$$x = 2,430,000$$

# QUADRATIC FUNCTIONS


1. The shape a quadratic function makes is a parabola. The maximum or minimum point of a quadratic function is called the vertex.

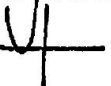
2. What does a solution/root/zero look like on a graph? x-intercept

3. The formula to find the axis of symmetry is  $x = \frac{-b}{2a}$  (from standard form)

4. The quadratic formula is  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ . It finds the solutions.

5. Tell whether the discriminant,  $b^2 - 4ac$ , must be greater than, less than, or equal to 0 to make each of the conditions true:

A. 2 x-intercepts  
  $b^2 - 4ac > 0$

B. 1 x-intercept  
  $b^2 - 4ac = 0$

C. no x-intercepts  $b^2 - 4ac < 0$

Basics 1 2 3 4 5

6. The height,  $d$ , of an object after  $t$  seconds is modeled by the equation  $d = -16t^2 + 3500$ . Find the height of the object after 3 seconds.  $d(3) = -16(3)^2 + 3500$

7. Find the vertex of  $y = -3x^2 + 12x - 8$ .  $x = \frac{-b}{2a} = \frac{-12}{2(-3)} = \frac{-12}{-6} = 2$ .  $f(2) = -3(2)^2 + 12(2) - 8 = -12 + 24 - 8 = 4$ . Vertex: (2, 4)

8. Find the vertex of  $y = \frac{2}{3}(x-2)^2 - 4$ . Vertex: (2, -4)

9. List the value of  $a$  and  $c$ , and describe how each of these values transforms the graph.

$y = -5x^2 + 8$   $a = -5$ , reflected over x-axis + skinny/vertical stretch  
 $c = 8$ , shift up 8

10. Find the solutions of  $2x^2 + 9x - 18 = 0$  using the method of your choice.  $x = -6, 1.5$

11. Which of the following is NOT a transformation of  $y = 3(x-5)^2 + 2$ ?  
 a. Skinnier b. Shifted right c. Shifted up d. Reflected over x-axis

Key Features 1 2 3 4 5

12. Expand  $(2x+3)(x-1)$   $2x^2 - 2x + 3x - 3 = 2x^2 + x - 3$

13. Factor the following completely:

a.  $x^2 + 3x - 10$

b.  $4x^2 - 36$

c.  $10x^2 - 4x$

d.  $3x^2 + 2x - 8$

$(x+5)(x-2)$

$4(x^2 - 9)$

$2x(5x - 2)$

$(3x-4)(x+2)$

$4(x-3)(x+3)$

Factoring 1 2 3 4 5

14.  $i = ? \sqrt{-1}$   $i^2 = ? -1$

15. Simplify  $\sqrt{-64}$   $8i$

16.  $(-2-i)(4+i)$   $-8 - 2i - 4i - i^2 = -8 - 6i + 1 = -7 - 6i$

17. Solve  $x^2 + 4 = 0$   
 $\begin{matrix} -4 & -4 \end{matrix}$

$$\sqrt{x^2} = \sqrt{-4}$$

$$x = \pm 2i$$

18. Solve  $(\sqrt{6-x})^2 (3i)^2$

$$6-x = 9i^2$$

$$\begin{matrix} -6 & -6 \end{matrix} \quad 6-x = 9(-1) = -9$$

$$-x = -15$$

$$x = 15$$

Imaginary Numbers 1 2 3 4 5

Overall rating for quadratic functions 1 2 3 4 5